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## **Introductory Chapter: Pediatric Cancer Survivors**

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Karen Wonders and Brittany Stout

Additional information is available at the end of the chapter

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### **1. Introduction**

Receiving a cancer diagnosis is very disheartening, but hearing a diagnosis for a child takes on a whole new set of knowledge and emotions. Pediatric cancers (ages 0–19) are a rare and challenging time for families, as well as for pediatricians and oncologists. While cancer is much less common among children compared to adults, 1 in 285 children will be diagnosed with the disease before the age of 20 years in the United States [2]. The incidence rate of pediatric cancers in the United States has increased slightly over the years (0.6% per year [2]), but rates of a 5-year survival for many of these cancer types have increased to an even greater degree due to advances in modern technology. For most cases, the cause of a childhood cancer is inconclusive, and gathering sound data in the area is challenging because pediatric cancers are so rare. From what researchers have been able to gather, there have been links between certain gene mutations passed from mother to child as well as an increased risk in children who experience gene changes during early growth in the womb [1].

There is a slight variability in pediatric characteristics relating to incidence rates and survival. These differences can be seen in sex, ethnicity, and age, but the reasons behind these variances are not well understood. While the rates of 5-year survivors are similar, incidence and mortality rates tend to be lower in girls than in boys. Conversely, in adolescents, incidence rates are similar and girls have lower mortality rates compared to boys [2]. There is even more variability when looking at ethnic background. Caucasian and Hispanic children have the highest incidence rates for developing cancer compared to African American children who have the lowest incidents rates but experience the lowest survival rates as well [3]. Children with Down syndrome are also at an increased risk of developing leukemia [1].

## 2. Differences in pediatric and adult cancers

Types of cancers that develop in child and adolescent populations differ from the adult population in several ways. The most prevalent types of cancers seen in children are leukemia (26%), cancers of the brain and central nervous systems (18%), and lymphoma (14%) [4]. These cancers are typically only seen in child populations, and this is due to the embryonic or developmental nature of the cancer origin. Since these cancers develop either while in-utero or develop from embryonic tissue, these cancers are rarely seen in adult populations. Those diagnosed closer to adolescence tend to reflect similar cancers to that of the adult population. Pediatric cancers are often the result of DNA mutations that happen very early in life (sometimes even before birth) and are not strongly linked to lifestyle or environmental cancers the way adult populations are [5].

Treatment mechanisms also differ in pediatric and adult populations. Some treatments given to adults are deemed unsafe for children due to their destructive nature [1]. Many times, pediatric cancers are handled with a team of experts, or the child's oncology group (COG), in order to determine the best routes of health care [1].

## 3. Types of childhood cancers

Pediatric cancers represent 1% of all new cancer cases, but these cancers are usually fast developing and require multidisciplinary teams including pediatric oncologists, surgeons, radiation oncologists, and other specialists [5]. Cancers in the pediatric populations can be further divided into common types of cancer affecting children (ages 0–14) and adolescents (ages 15–19). The most common cancer types for children are lymphocytic leukemia, brain and central nervous system, neuroblastoma, and non-Hodgkin's lymphoma, while adolescents are more commonly diagnosed with Hodgkin's lymphoma and thyroid carcinoma [2, 5].

Similar to adult populations, pediatric cancer treatments come accompanied with many harsh side effects. Milder side effects can include rash, pain, and upset stomach and can usually be eased with medication and healthy living [1]. Cancer can affect these children very early in life, sometimes interrupting the natural growth and development processes. Harsher side effects experienced with treatment can interrupt or halt the natural development in organs and tissues, changing their function [1, 5].

## 4. Prevention, treatment, and outcomes

Obtaining sound data in terms of prevention has been found to be difficult as pediatric cancers are so rare, and many prevention mechanisms would be attributed to womb development. What is known regarding prevention is that there is a lack of control in terms of reducing the risk of incidence. Research has shown that physical activity and proper nutrition (to name a

few) can improve treatment and survivorship parameters, but there has been little progress in terms of prevention [6].

For most cancer types in the pediatric community, the treatment option that tends to respond best is chemotherapy. Children are often able to handle higher doses of chemo drugs for shorter periods of time [1]. In addition, children's bodies are better capable of handling chemotherapy treatments than adults. Radiation treatment is also an option for pediatric cancers, but children (especially very young children) are more likely to be affected negatively, and radiation therapy can lead to potential long-term side effects that can be experienced later in life. As pediatric cancers affect children at a young age, along with there being an increase in survivors, management and frequent follow-up care are important.

## 5. Conclusion

Within the content of the following chapters, these topics and points will be discussed in more detail. The information found within this book will enhance professionals' knowledge in the field of pediatric oncology and provide a sounder outlook for incidence, prevention, treatment, and outcomes. Although further research needs to be done in this area for more specific knowledge to be gained, this book is filled with the most up-to-date information in the field of pediatric oncology thus far.

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